IS 14394 (1996): Industrial Fasteners - Hexagon Nuts of Product Grade C - Hot-Dip Galvanized (Size Range M12 to M36) [PGD 31: Bolts, Nuts and Fasteners Accessories]

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IS 14394 : 1996
(Reaffirmed 2001)

भारतीय मानक

औद्योगिक बन्धक सामग्री — उत्पादन ग्रेड सी के षटकोणीय शीर्ष वाली ढिबरियाँ — तप्त-निमज्जी जस्तीकृत — विशिष्टि

(साइज रेंज एम 12 से एम 36 तक)

Indian Standard

INDUSTRIAL FASTENERS — HEXAGON NUTS OF PRODUCT GRADE C — HOT-DIP GALVANIZED — SPECIFICATION

(Size Range M12 to M36)

ICS 21.060.20

BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

October 1996

Price Group 2

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Bolts, Nuts and Fasteners Accessories Sectional Committee had been approved by the Light Mechanical Engineering Division Council.

Structural industries, particularly electrical transmission and tower erection industries were hitherto using product grade C hexagon nuts as per IS 1363 (Part 3) : 1991 after hot-dip galvanization and oversize tapping for mating with galvanized product grade C hexagon bolts in the absence of an appropriate Indian Standard for such usage. This standard is expected to fulfil this need.

This standard shows both single (full bearing) and double chamfered forms of hexagon nuts as permissible alternatives. The former type is particularly suitable for use with spring washers to IS 3063 'Single coil rectangular section spring washers for bolts, nuts and screws' for more contact area.

Since presently IS 4218 does not cover the fundamental deviation (tolerance 7AX) for threads, therefore Annex A (based on ISO/DIS 965-5) has been incorporated in this standard for convenience of the users.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

INDUSTRIAL FASTENERS — HEXAGON NUTS OF PRODUCT GRADE C — HOT-DIP GALVANIZED — SPECIFICATION (Size Range M12 to M36)

1 SCOPE

1.1 This Indian Standard covers requirements for hot-dip galvanized hexagon nuts of property classes 5 and 8, product grade C, with thread diameters from M12 to M36 inclusive.

1.2 The nuts covered by this standard are tapped oversize totolerance class 7AX (*see* Annex A).

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1367	Technical supply conditions for threaded steel fasteners
(Part 1) : 1980	Introduction and general information (*second revision*)
(Part 2) : 1979	Product grades and tolerances (*second revision*)
(Part 3) : 1991 ISO 898-1: 1988	Mechanical properties and test methods for bolts, screws and studs with full loadability (*third revision*)
(Part 6) : 1994	Mechanical properties and test methods for nuts with specified proof loads (*third revision*)
(Part 13) : 1983	Hot-dip galvanized coatings on threaded fasteners (*second revision*)
(Part 17) : 1996	Acceptance criteria (*second revision*)
4218	ISO Metric screw threads
(Part 2) : 1976	Diameter pitch combinations (*first revision*)
(Part 4) : 1976	Tolerancing system (*first revision*)
(Part 6) : 1978	Limits of sizes for commercial bolts and nuts (diameter range 1 mm to 52 mm) (*first revision*)

3 DIMENSIONS

The dimensions read with Fig. 1 shall be as given in Table 1.

Table 1 Dimensions for Hexagon Nuts

All dimensions in millimetres.

Thread size d [1]		M12	M16	M20	(M22)	M24	(M27)	M30	(M33)	M36
p [2]		1.75	2	2.5	2.5	3	3	3.5	3.5	4
d_w	*Min*	16.5	22	27.7	31.4	33.3	38	42.8	46.6	51.1
e	*Min*	19.85	26.17	32.95	37.29	39.55	45.2	50.85	56.37	60.79
m	*Max*	12.2	15.9	19	20.2	22.3	24.7	26.4	29.5	31.5
	Min	10.4	14.1	16.9	18.1	20.2	22.6	24.3	27.4	29
m'	*Min*	8.3	11.3	13.5	14.5	16.2	18.1	19.5	21.9	22.4
s	*Nom = Max*	18	24	30	34	36	41	46	50	56
	Min	17.57	23.16	29.16	33	35	40	45	48	53.8

[1] Thread sizes in brackets are non-preferred.

[2] p = pitch of the thread.

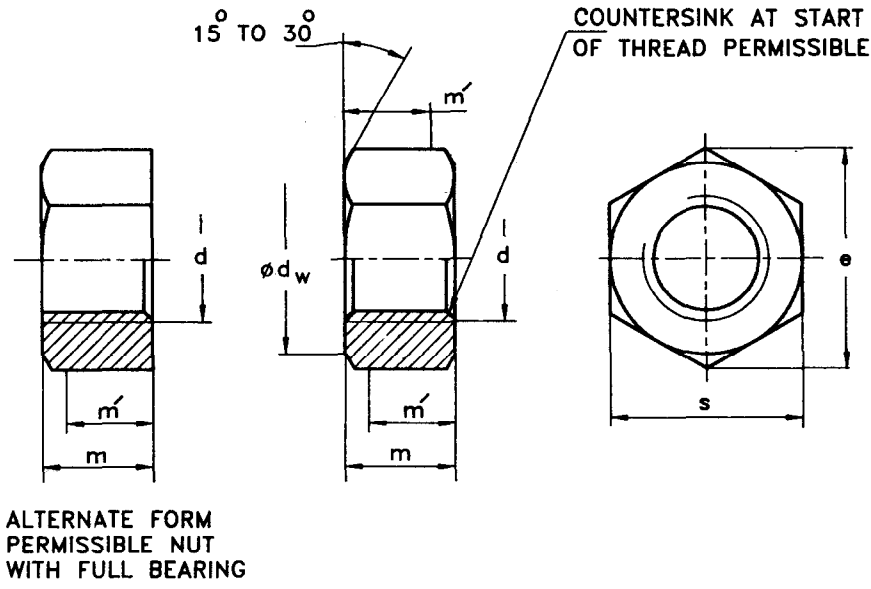

FIG. 1 HEXAGON NUT

4 TECHNICAL SUPPLY CONDITIONS

Requirement		*Conforming to*	
Material		Steel	
General requirements	Indian Standard	IS 1367 (Part 1) : 1980	
Thread	Tolerance	7AX[1] (*see also* Annex A)	
	Indian Standards	IS 4218 (Part 2) : 1976 IS 4218 (Part 6) : 1978	
Property Class		5[2]	8[2]
Mechanical properties	Indian Standard	IS 1367 (Part 6) : 1994	
	Property class of hot-dip galvanized mating bolts[3]	4.6, 4.8, 5.6, 5.8	6.8, 8.8
Product grade		C	
Tolerances	Indian Standard	IS 1367 (Part 2) : 1979	
Surface finish	Type	Hot-dip galvanized	
	Indian Standard	IS 1367 (Part 13) : 1983	
Acceptability		IS 1367 (Part 17) : 1996	

[1] The nuts are oversize tapped. The thread tolerances for oversize tapped hot-dip galvanized hexagon nuts of product grade C are not covered in IS 1367 (Part 13) : 1983 and these have been temporarily designated as 7AX. The thread limits for these tolerance class are included in Annex A on a provisional basis pending adoption of this thread class in IS 4218.

[2] For proof load values, *see* 5.

[3] Property class of hot-dip galvanized mating bolts to IS 1367 (Part 3) : 1991.

5 PROOF LOAD VALUES

5.1 Proof load values of nuts corresponding to tolerance class 7AX shall be as given in Table 2.

5.2 Proof load values given in Table 2 are based on the following proof load stresses.

Thread Size *d*	*Property Class*	
	5	8
	Stress under proof load S_p N/mm²	
M12 M16	490	670
M20 (M22) M24 (M27) M30 (M33) M36	500	740

NOTE — Thread sizes in brackets are non-preferred.

6 DESIGNATION

The hot-dip galvanized hexagon nuts of product grade C shall be designated by thread size *d*, property class and number of this standard.

6.1 A hot-dip galvanized hexagon nut of product grade C, of thread size d = M16 and property class 5 shall be designated as:

Hot-dip galvanized Hexagon Nut - M16 - 5- IS 14394

7 MARKING

Product shall be marked in accordance with the requirements of IS 1367 (Part 6) : 1994.

7.1 The product may also be marked with the Standard Mark.

7.2 The use of the standard mark is governed by the provisions of the *Bureau of Indian Standard Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Table 2 Proof Load Values for Tolerance Class 7AX

Thread Size *d*	Pitch of Thread *p* mm	Nominal Stress Area of Standard Test Mandrel A_s mm²	Property Class	
			5	8
			Proof Load ($A_s \times S_p$), N	
M12	1.75	84.3	41 300	56 500
M16	2	157	77 000	105 200
M20	2.5	245	122 500	181 300
(M22)	2.5	303	151 500	224 300
M24	3	353	176 500	261 300
(M27)	3	459	229 500	339 700
M30	3.5	561	280 500	415 200
(M33)	3.5	694	347 000	513 600
M36	4	817	408 500	604 600

NOTES

1 Thread sizes in brackets are non-preferred.

2 All other mechanical property requirements are as per IS 1367 (Part 6) : 1994.

3 For methods of test, *see* IS 1367 (Part 6) : 1994.

ANNEX A

(*Foreword* and *Clauses* 1.2 *and* 4)

THREAD LIMITS FOR HOT-DIP GALVANIZED HEXAGON NUTS, PRODUCT GRADE C, TOLERANCE CLASS 7AX

The thread limits for hot-dip galvanized hexagon nuts, product grade C with the thread tolerance class 7AX. are given in Table 3 below:

Table 3 Thread Limits of Tolerance Class 7AX

Thread Size	Lenght of Thread Engagement (mm)		Major Diameter (mm)	Pitch Diameter (mm)		Minor Diameter (mm)	
d	Over	Up to and Including	*Min*	*Max*	*Min*	*Max*	*Min*
M12	6	18	12.35	11.463	11.213	10.881	10.456
M16	8	24	16.40	15.366	15.101	14.710	14.235
M20	10	30	20.40	19.056	18.776	18.254	17.694
(M22)	10	30	22.40	21.056	20.776	20.254	19.694
M24	12	36	24.45	22.836	22.501	21.832	21.202
(M27)	12	36	27.50	25.886	25.551	24.882	24.252
M30	15	45	30.55	28.632	28.277	27.471	26.761
(M33)	15	45	33.55	31.632	31.277	30.471	29.761
M36	18	53	36.60	34.377	34.002	33.020	32.270

NOTES

1 Nuts are tapped oversize to the above dimensions after galvanizing.

2 The thread limits in Table 3 are based on a fundamental deviation EI_{AX} of:

350 µm for M12

400 µm for M16, M20 and M22

450 µm for M24

500 µm for M27

550 µm for M30 and M33

600 µm for M36

The Fundamental deviation EI_{AX} for thread sizes > M36 ≤ M64 are shown below for guidance only:

800 µm for > M36 ≤ 48

1000 µm for > M48 ≤ M64

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards : Monthly Additions'.

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